

INSTRUCTION MANUAL

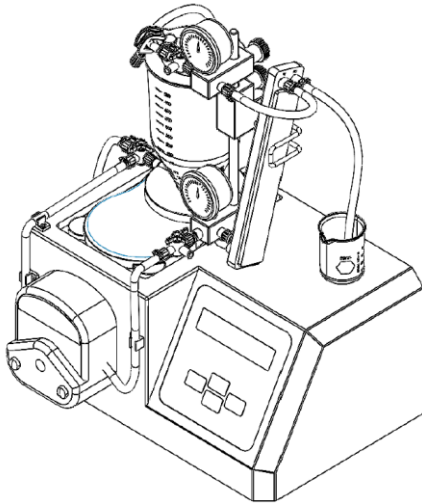
Tangential Flow Filtration System

Model No.

Tanfil 100



Video List



ROCKER

Please read this instruction manual before using this product.

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1. Important Notice

This instrument is designed for laboratory usage only. Please read this manual carefully before installing and operating. The instrument shall not be modified in any way. Any modification will void the warranty and may result in potential hazard. We are not responsible for any injury or damage caused by any non-intended purposes and modifying the instrument without authorization.

1. Check the voltage specified on the name plate and ensure it matches the line voltage in your location.
2. Please check the sample solution and the material of the instrument with chemical compatibility chart before using.
3. Do not place the instrument nearby any flammable or explosive materials. Install the instrument in a clean, dust-less and ventilated area.
4. During the operation, overpressure or thick liquid will cause larger loading to the motor module, the motor module will stop automatically for self-protection. Please turn off the power and turn it on again after 5 minutes.
5. Please clean the tubes and appearance of the instrument after using it.
6. If you have any problems with using the instrument, please contact the service crew for help. DO NOT disassemble improperly.
7. Please discard packaging materials in accordance with relevant local regulations.
8. For more information, please check out the official website and the latest product guide.
9. Operating Condition
 - (a) Ambient temperature: 5~ 50°C
 - (b) Relative humidity: 80% RH Max.
 - (c) Power supply: 100-240V~, 50/60Hz, 50W
 - (d) Fuse: T1.5A, 250V
 - (e) Altitude: up to 2000 m
 - (f) Pollution degree: II
 - (g) Indoor use



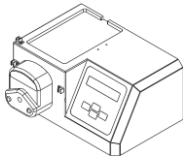


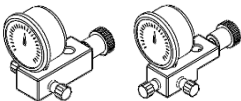


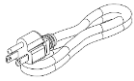

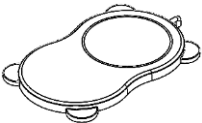
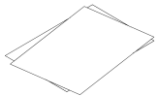
Pressure in tubing should be less than 40 psi, or the tubing would be expanded due to overpressure.



Please turn off and unplug the instrument before changing the fuse.

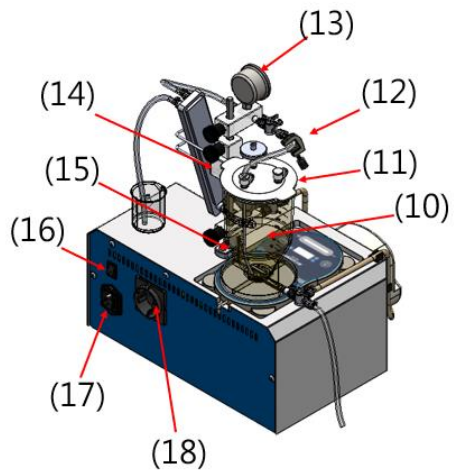
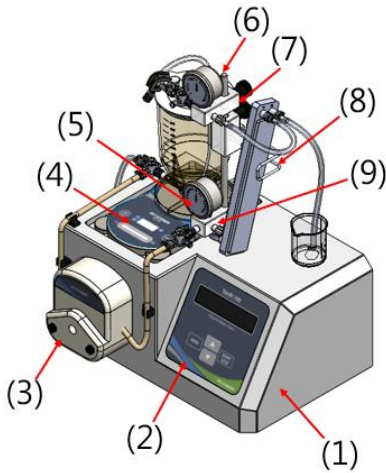
2. Unpacking

Please check if the package is complete without any damage before unpacking. When unpacking, please make sure you have all accessories that indicated on the list. If there is any problem, please keep the serial number along with packing case and contact the local distributor or contact us by e-mail: export@rocker.com.tw immediately for assistance.

| Item | Designation | Item | Designation |
|------|--------------------------------------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Tanfil 100 Main Unit  | 6 | Reservoir (including Lid Kit)  |
| 2 | Support Base Set  | 7 | Gauge Mounting Set (including Pressure Gauge) (2)  |
| 3 | Tanfil 100 Repair Kit  | 8 | Capsule Bracket  |
| 4 | Power Line  | 9 | Base for Capsule Bracket  |
| 5 | Magnetic Stirrer  | 10 | Instruction Manual  |

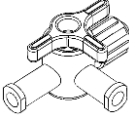
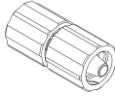



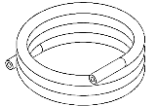
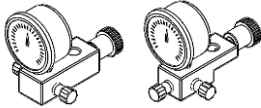
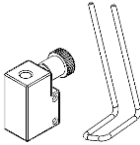
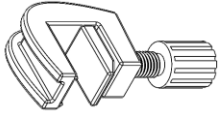

3. Main Part Diagram

(1) Main Part



| Item | Designation | Item | Designation |
|------|--------------------------------|------|-----------------------------------------|
| 1 | Main Unit | 10 | Reservoir |
| 2 | Operation Panel | 11 | Lid Kit of Reservoir |
| 3 | Pump Head | 12 | Screw Clamp for Tubing |
| 4 | Magnetic Stirrer | 13 | Retentate Pressure Gauge |
| 5 | Feed Pressure Gauge | 14 | Base for Capsule Bracket |
| 6 | Support Rod | 15 | Support Base |
| 7 | Retentate Gauge Mounting Block | 16 | SPDT Power Switch |
| 8 | Capsule Bracket | 17 | AC Socket with Fuse (Input) |
| 9 | Feed Gauge Mounting Block | 18 | AC Socket for Magnetic Stirrer (Output) |

(2) Accessories (components, luer, tubing)

| | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p>Three-Way Stopcock (4)</p> |  <p>Male Luer Coupler (2)</p> |  <p>Male Luer Lock - 1/8" hose barb (12) Female Luer Lock - 1/8" hose barb (1)</p> |
|  <p>Female Luer Caps (2)</p> |  <p>Tubing Clamps (13)</p> |  <p>Tube -ULTR-C / 1.5 m (1)</p> |
|  <p>Retentate Gauge Mounting Set (1) Feed Gauge Mounting Set (1)</p> |  <p>Base for Capsule Bracket (1) Capsule Bracket (1)</p> |  <p>Screw Clamp for Tubing (1)</p> |
|  <p>Hex wrench (1)</p> | | |

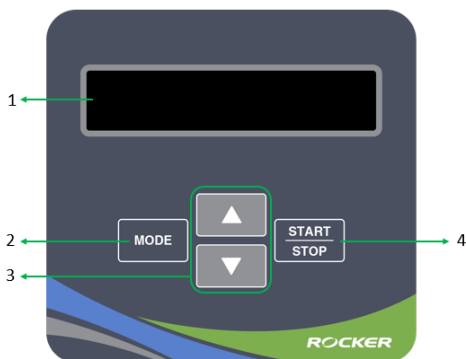
(3) Material

| Item | Material | Item | Material |
|--------------------|-------------|----------------------|-----------------------------------|
| Reservoir | PES | Gauge Wetted Parts | SS316 |
| Reservoir Lid | PP | Gauge Mounting Block | PP |
| O-ring (Reservoir) | Silicon | Luer Connector | SS316, PP |
| Magnetic Stir Bar | PTFE Coated | O-ring (Luer) | NBR |
| Three-Way Stopcock | PC, POM | Tube | Silicone (platinum-cured), TPE |
| Capillary Tube | PTFE | | |

4. Button / Symbol / Display Explication

(1) Operation







| Position | Designation |
|----------|-------------------|
| 1 | Display |
| 2 | MODE Button |
| 3 | UP/DOWN Button |
| 4 | START/STOP Button |



(2) Buttons

| Symbol | Name | Designation |
|------------|-------------------|-------------------------------------------------------------------------------------------|
| ▲ | UP Button | Select program or change setting value. (Hold the button to change value continuously) |
| ▼ | DOWN Button | Select program or change setting value. (Hold the button to change value continuously) |
| MODE | MODE Button | Switch the functions. (rpm/Time/Direction) |
| START/STOP | START/STOP Button | Start or stop the operation. (Hold the button to enter Fast Clean Mode) |

(3) Symbols

| Symbols | Designation | Description |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----------------------|
|  /  | Direction of Pump Head | CW/CCW |
|  /  | Type of Timer | Timer/Countdown Timer |
|  /  | Fast Clean Mode | Maximum rpm, CW/CCW |

(4) Display



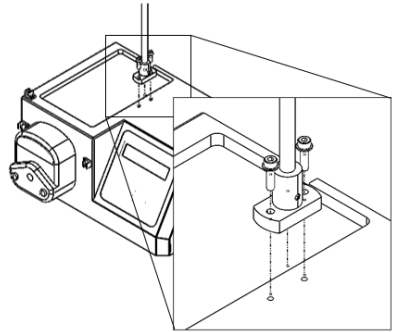
| Position | Designation | Position | Designation |
|----------|------------------------|----------|-----------------|
| 1 | Speed (rpm) | 4 | Type of Timer |
| 2 | Direction of Pump Head | 5 | Fast Clean Mode |
| 3 | Timer (sec/min) | | |

5. Installation

(1) Support Base Set

To install the support base set on the platform of case, using a hex wrench to fasten and fix the 2 hex socket head cap screws.

Please notice the direction of support rod, the machining plane of support rod is facing to the aft side.

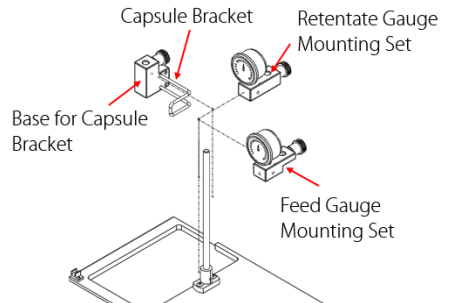


(2) Gauge Mounting Set

a. Install the feed gauge mounting set through the support rod with gauge facing forward, fasten and tighten the set with hand screw on the back.

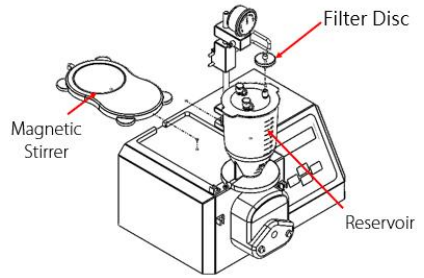
b. Install the capsule bracket into the base for capsule bracket. Then install this assemble through the support rod, fasten and fix it on to the middle of the support rod with hand screw.

c. Install the retentate gauge mounting set through the support rod with gauge facing forward, fasten and fix the set on to the upper side of support rod with hand screw.



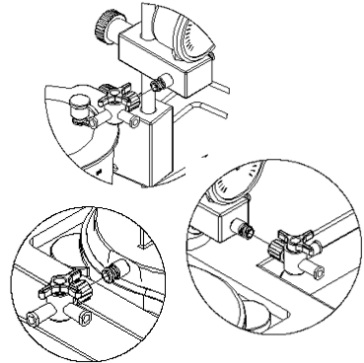
(3) Magnetic Stirrer and Reservoir

Place the magnetic stirrer in the groove of the platform and plug the AC socket on the backward of Tanfil 100. Install the filter disc on to the lit, and put the reservoir (with lid) on to the magnetic stirrer.



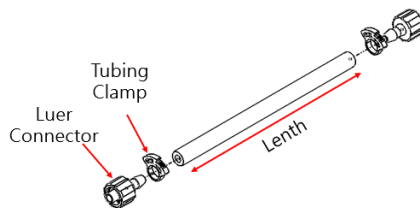
(4) Three-Way Stopcock

Install the three-way stopcocks to the retentate gauge mounting block, feed gauge mounting block and reservoir. Refer to 3. Main Part Diagram for the installation positions.



(5) Tubing

a. Please cut the tubing and install the luer connectors according to the following information.

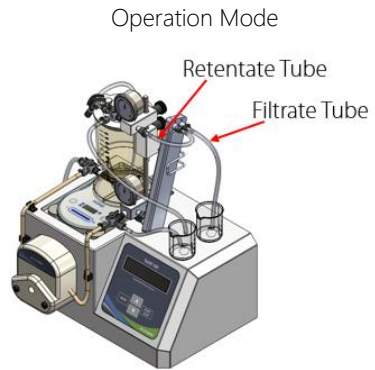
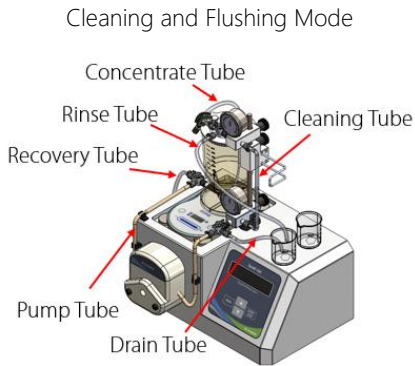


| Tubing Name | Silicone Tube Model / Color | Length | Luer Connectors |
|--------------------|-----------------------------|--------|--------------------------------------|
| Pump Tubing | Pharmed / Milky White | 50 cm | Male Luer 1/8" hose barb (dual) |
| Retentate Tubing | Ultra-C / Translucent | 15 cm | Male Luer 1/8" hose barb (dual) |
| Concentrate Tubing | Ultra-C / Translucent | 15 cm | Male Luer 1/8" hose barb (single) |
| Recovery Tubing | Ultra-C / Translucent | 20 cm | Male luer -1/8" hose barb (single) |
| Drain Tubing | Ultra-C / Translucent | 20 cm | Male luer -1/8" hose barb (single) |
| Filtrate Tubing* | Ultra-C / Translucent | 20 cm | Female luer -1/8" hose barb (single) |
| Cleaning Tubing | Ultra-C / Translucent | 15 cm | Male luer -1/8" hose barb (dual) |
| Rinse Tube | Ultra-C / Translucent | 20 cm | Male luer -1/8" hose barb (single) |

*Specification of luer connectors depends on the capsule.

*After installing the tubing, please install the screw clamp to the concentrate tubing.

b. Tubing Position



6. Operation

There are several operation procedures in this system, please follow the steps below to set up the flow path you need. For cleaning procedure and solution for capsules, please refer to the instruction manuals of capsules.

(1) Cleaning

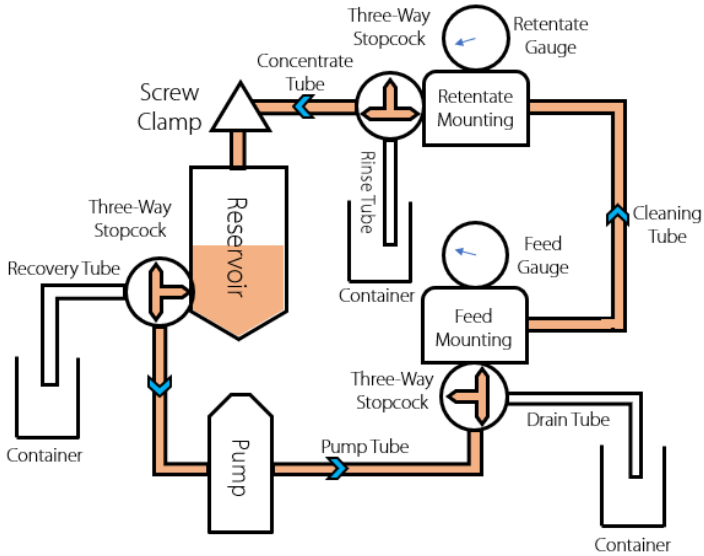


Figure 1

- Please clean the system with the following steps before first use. Use the cleaning tubing to connect the feed and retentate gauge mounting blocks, as shown in figure 1.
- Pour the cleaning solution into the reservoir and cap it with the lid kit.
- Set the three-way stopcocks and adjust the flow path as shown in figure 1.
- Turn on the pump, increase the speed slowly to 50 rpm.
 - Please check if there is any leakage. Make sure to fasten all the connectors.
- Let the system circulate for 15~30 minutes, and turn off the pump.

(2) Draining and Collection

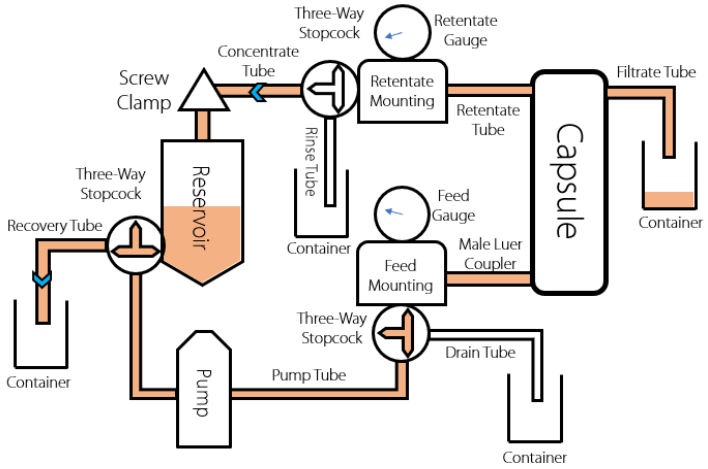


Figure 2

- When the pump is stopped, setting the three-way stopcocks as shown in figure 2.
- Open one of the lid caps on the reservoir lid, the solution would flow through the recovery tubing to the container automatically by gravity.

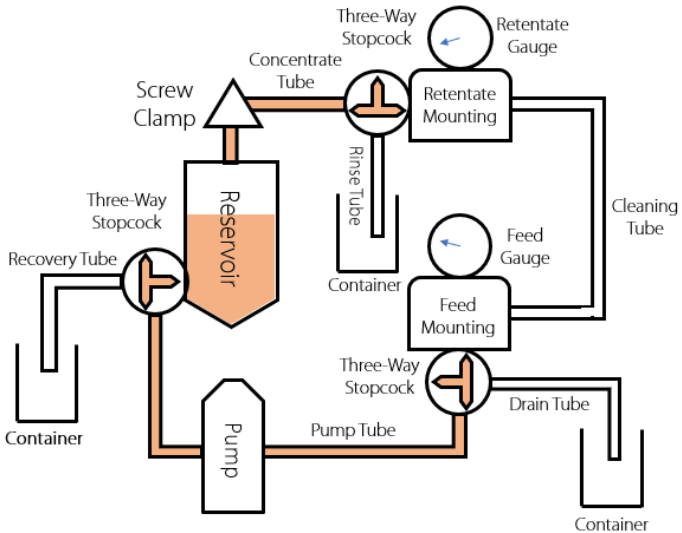


Figure 3

- c. If you need to collect the solution in the system after experiment, please turn off the pump first and adjust the three-way stopcocks, then exchange the capsule to the cleaning tubing as shown in figure 3.

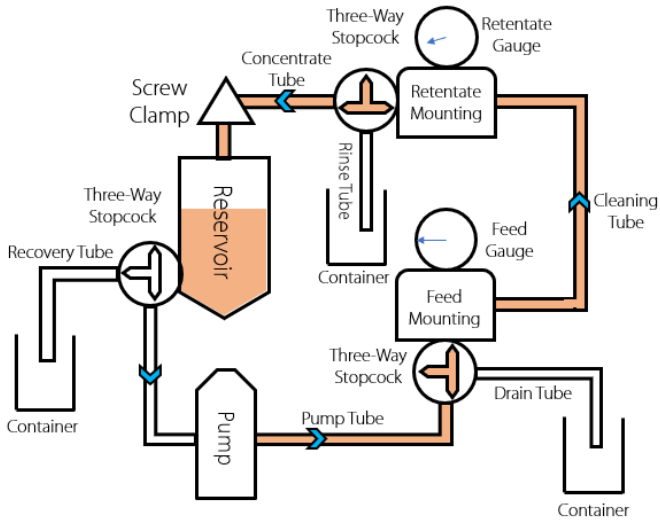


Figure 4

- d. Turn on the pump to collect all the solution into the reservoir and turn off the pump after collection. The flow path refers to figure 4.

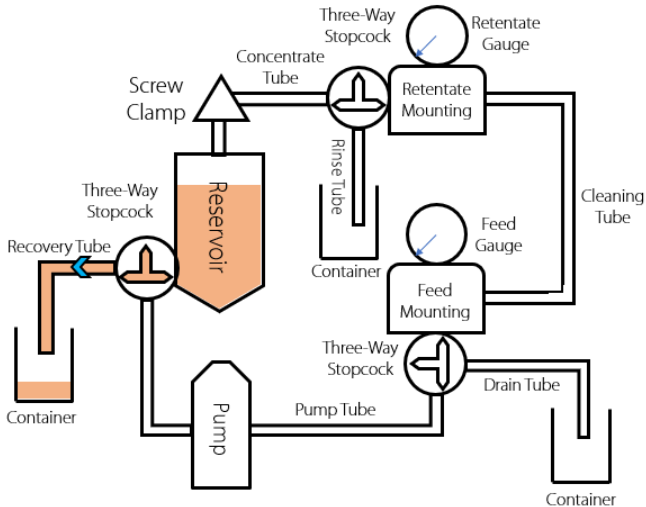


Figure 5

- e. Setting the three-way stopcock at the bottom of the reservoir to adjust the flow path as shown in figure 5. Open one of the lid caps on the reservoir lid, the solution would drain automatically by gravity.

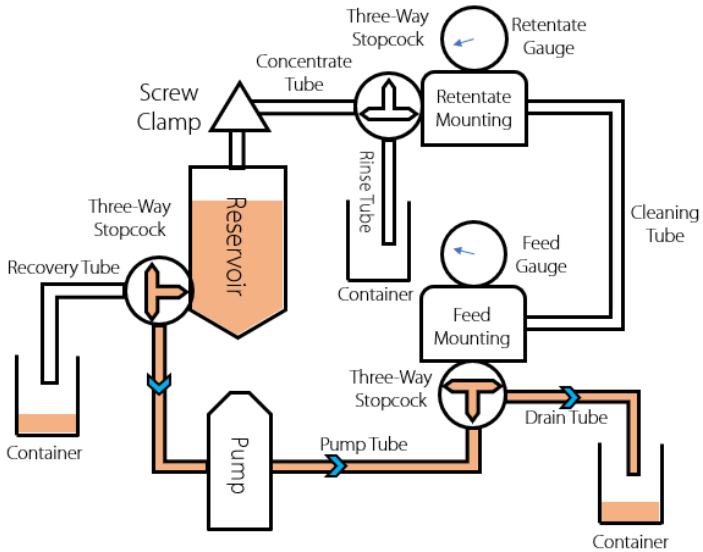


Figure 6

- f. To drain the solution completely, please set the three-way stopcock of the reservoir and adjust the flow path as shown in figure 6. Turn on the pump to drain the solution.
- ◆ Tubing can be removed for high temperature sterilization as required after first use and cleaning.

(3) Capsule Rinsing

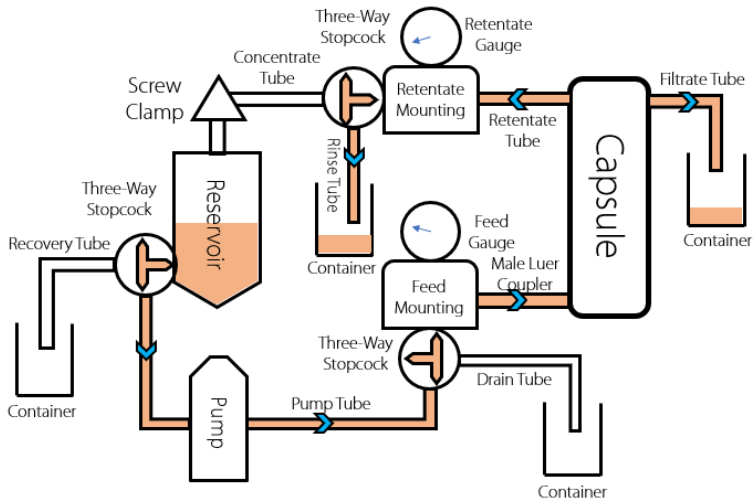


Figure 7

I. Rinsing Capsule

- Set the three-way stopcocks and adjust the flow path as shown in figure 7. Pour the rinsing solution into the reservoir.
- Turn on the pump. Increase the speed (rpm) slowly until the feed pressure achieves to the suggested value that depends on the capsule.
 - ◆ Please check if there is any leakage. Make sure to fasten all the connectors.
- Circulate the rinsing solution continuously. The rinsing solution volume refers to the operation manuals of the capsule.

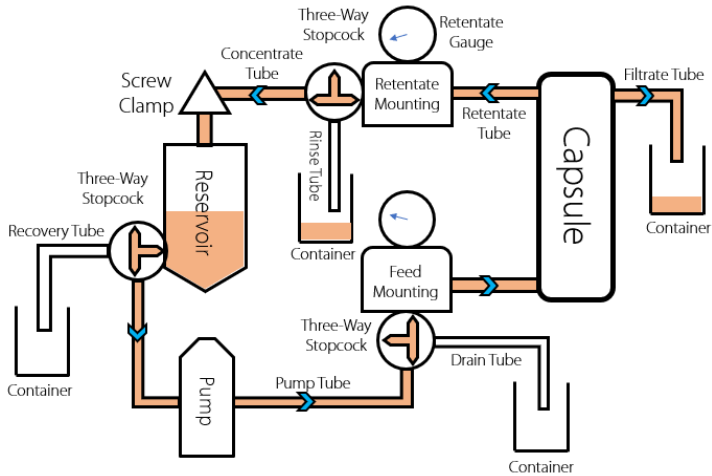


Figure 8

II. Rinsing the Capsule and the System

- a. Set the three-way stopcocks and adjust the flow path as shown in figure 8
- b. Turn on the pump. Increase the speed (rpm) slowly until the feed pressure achieves to the suggested value that depends on the capsule.
 - ◆ Please check if there is any leakage. Make sure to fasten all the connectors.
- c. Adjust the screw clamp and the speed (rpm) of pump until the retentate and feed pressure achieve the suggested value that depends on the capsule.
- d. Circulate the rinsing solution continuously until the volume of the solution in reservoir left as suggested. Turn off the pump, and refer to “(2) Draining and Collecting” steps as mentioned before to drain the solution.
 - ◆ Please clean the capsule before resining it. The cleaning method of capsule depends on its own operation manual.

(4) Pretreatment and Concentration

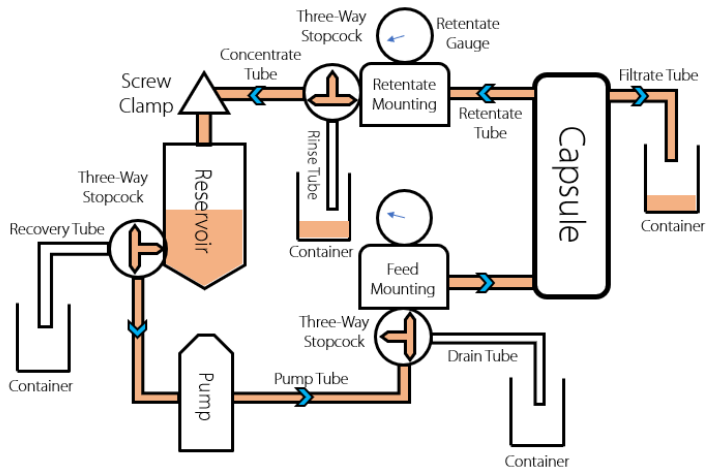


Figure 9

I. Pretreatment

- Set the three-way stopcocks and adjust the flow path as shown in figure 9.
- Pour the buffer into the reservoir. Turn on the pump and increase the speed (rpm) slowly to fill the tube without bubbles. The feed pressure depends on capsule itself.
 - ◆ Please check if there is any leakage. Make sure to fasten all the connectors.
- Stop the pump just as the volume in the reservoir reaches the bottom. Disassemble the filtrate tubing to pour out all the liquid in the tube, then assemble the tubing back to the capsule to complete the pretreatment.

II. Concentration

- a. Pour the sample solution into the reservoir, turn on the pump. The feed pressure depends on capsule itself.
- b. Adjust the screw clamp and the speed (rpm) of pump until the feed pressure and retentate pressure achieve to the pressure as suggested. Suggested pressure depends on capsule itself.
 - ◆ The feed pressure should NOT be greater than the suggested pressure of the capsule and the retentate pressure should NOT be greater than 40 psi.
- c. Continuous circulation for the expected concentration of the solution. And turn off the pump.
- d. Refer to “(2) Draining and Collecting” steps as mentioned before to collect all the sample solution into the container.

(5) Continuous Sampling

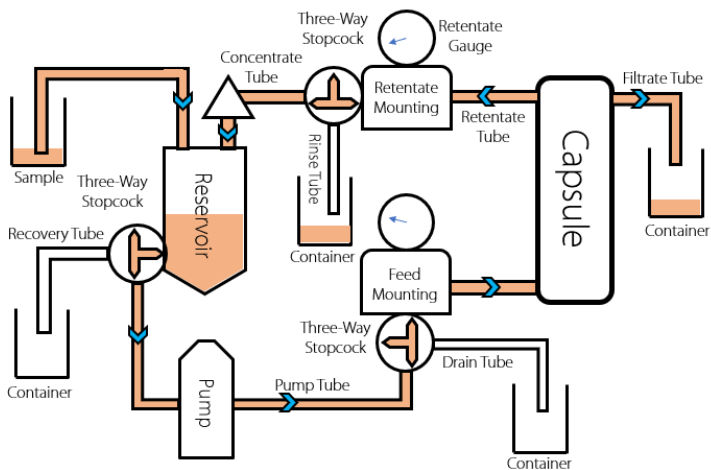


Figure 10

Samples over 500 mL could be put in other flasks. Use a silicone tube to connect the reservoir lid and the flask, as shown in figure 10. During the diafiltration, the system will become negative-pressure gradually. Thus, the solution in the flask will transfer to the reservoir automatically.

7. Usage and Maintenance of Capsule

In this manual, we take Pall Minimate TFF Capsule as example. For other capsules, please refer to manufacture's instruction manuals.

(1) Using the Capsule for the First Time

I. Flushing

- a. Pour about 500 mL deionized water into the reservoir. Slowly adjust the flow rate until the feed pressure reaches < 2 bar (about 30 psi).
- b. Place the tubing from the retentate and filtrate ports into a waste container.
- c. Slowly increase the retentate pressure by screw clamp until the retentate flow rate is approximately equal to the filtrate flow rate. Both tubing should drain about 250 mL water individually.
 - ◆ Filtrate flow rate is relatively slow when using a smaller Molecular Weight Cut Off (MWCO) capsule. Flushing about 500 mL water is enough in principle.

II. Determining the "Original" Normalized Water Permeability (NWP) of Capsule

- a. After flushing, pour deionized water into the reservoir.
- b. Close retentate port and slowly increase the speed (rpm) until the feed pressure reaches 1 bar (about 15 psi).
- c. Record the volume of drain from filtrate port in 10 minutes. And converts the data to filtrate flow rate (mL/min).
 - ◆ You can measure the volume of drain by
(1) balance for weight or (2) graduated cylinder for volume.

(2) Cleaning after Using

I. Choosing the Cleaning Solution

- ◆ Using 30~45°C solution to enhance the cleaning effect.
 - 0.1 N~0.5 N NaOH
 - 0.1 N Nitric acid
 - 0.1 N Acetic acid
 - 0.1 N Phosphoric acid

II. Cleaning Steps:

- a. Drain the Waste: After recover the sample, place the tubing from the retentate and filtrate ports into a waste container.
- b. Flushing with Deionized Water: Refer to (1) I. Flushing.
- c. Cleaning with Cleaning Solution: follow the steps below to clean the capsule. Make sure that the feed pressure should NOT exceed 2 bar (about 30 psi).
 - i. Place about 500 mL cleaning solution into the reservoir. Open the retentate port and close the filtrate port, retentate for about 30 minutes.
 - ii. Change 500 mL of new cleaning solution, retentate 30 minutes and drain the solution.
 - iii. Change 500 mL of new cleaning solution. Close retentate port and open filtrate port, pump about 250 mL ~ 300 mL of solution through filtrate tubing.
- d. Determining the Membrane Recovery: Repeat (1) II. NWP test to evaluate the condition of capsule.

Membrane Recovery = NWP (after cleaning) / NWP (original)

- Membrane recovery < 75 % → Clean the capsule again.

- Membrane recovery < 50 % → Replace with a new capsule.

(3) Storage of Capsule

Before storage, please **make sure** you clean the capsule as (2) II. Cleaning Steps every time.

| Period | Solution |
|------------|---------------------------------------------------------|
| < 3 days | Sterile water |
| < 6 months | 0.05N ~ 0.1N sodium hydroxide (NaOH) |
| > 6 months | 15 % glycerin + 0.05 % sodium azide (NaN ₃) |

- ◆ Flushing the capsule before using every time. (Refer to (1) I. Flushing)

8. Maintenance

1. Please unplug the instrument before cleaning it.
2. Please operate the instrument in well ventilated area and keep it clean all the time. If there is any solvent splash to the case, please wipe it off to avoid the damage caused by corrosion.
3. O-rings are consumable materials that should be replaced annually. If there is any functional disorder, please replace it as soon as possible.
4. Silicone tubes are consumable materials. If the tubes broke or expand during the operation, please replace it as soon as possible.
5. If the fuses burnt, please troubleshoot first. And use flathead screwdriver to screw up the fuse holder. The fuse holder is equipped with spare fuse.

9. Troubleshooting

| Issue | Cause and Solution |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Abnormal Display | Loose plug → Reconnect plug to power supply. Fuse burn → Replace a new fuse. Display or components failure → Contact distributor for assistance. |
| Suddenly Stop of Motor during Operation | Overload of pump module → Slow down the speed and loosen the screw clamp. Restart the instrument. |
| No Stir with Magnetic Stirrer | Loose plug → Reconnect plug to power supply. Disorder of magnetic stirrer → Contact distributor for assistance. |
| Expand of Silicone Tube during Operation | Overpressure of silicone tube → Slow down the speed and loosen the screw clamp. Replace with a new silicone tube. Capsule block → Replace with a new capsule. |
| Others | Contact distributor for assistance. |

Ordering Information

| | |
|---------------|---------------------------------------------------------------------------------------|
| 184100-01(02) | Tanfil 100, Tangential Flow Filtration System, AC100-240V, 50/60Hz, US plug (EU plug) |
| 184100-20 | High Flow Rate Pump Head, ~ 2160 mL/min |
| 184100-40 | Reservoir Set |
| 184100-62 | Tanfil 100 Repair Kit |
| 203100-01 | MS 100, Low Profile Magnetic Stirrer, AC100-240V, 50/60Hz, US plug |
| 203100-10 | PTFE Magnetic Stirring Bar, Ø 3.6 x 25 mm |